

What is claimed is:

1. A power factor correction circuit for improving a power factor of a switching power supply, wherein said switching power supply is composed of said power factor correction circuit and a converter with a secondary winding and a primary winding coupled with a switching device, said circuit comprising:
 - a winding with an opposite polarity to said primary winding;
 - a diode coupled with said winding; and
 - a capacitor coupled with said diode, wherein said capacitor and said diode have a common node connected with said primary winding.
2. The power factor correction circuit of claim 1, wherein said circuit further comprises an inductor to filter noise.
3. The power factor correction circuit of claim 1, wherein said winding, said secondary winding and said primary winding are wound in a same core.
4. The power factor correction circuit of claim 1, wherein said converter is a forward-type, push-pull-type, half-bridge-type, full-bridge-type or resistor-capacitor-control type.
5. The power factor correction circuit of claim 1, wherein the ratio of the number of the turns of said winding to said primary winding approaches 1.

6. The power factor correction circuit of claim 1, wherein said switching device controls said capacitor to charge said primary winding.

7. The power factor correction circuit of claim 1, wherein said capacitor
5 is charged when said diode is forward-biased.

8. The power factor correction circuit of claim 1, wherein a power is transferred to said secondary winding through said primary winding when said diode is reverse-biased.

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9. A power factor correction circuit for improving a power factor of a switching power supply, wherein said switching power supply is composed of said power factor correction circuit and a converter with a secondary winding and a primary winding coupled with a switching device, said circuit comprising:

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a winding with an opposite polarity to said primary winding;

a diode coupled with said winding;

an inductor coupled with said diode; and

a capacitor coupled with said inductor, wherein said capacitor and said inductor have a common node connected with said primary winding.

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10. The power factor correction circuit of claim 9, wherein said inductor is used to filter noise.

11. The power factor correction circuit of claim 9, wherein said winding,
25 said secondary winding and said primary winding are wound in a same core.

12. The power factor correction circuit of claim 9, wherein said converter is a forward-type, push-pull-type, half-bridge-type, full-bridge-type or resistor-capacitor-control type.

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13. The power factor correction circuit of claim 9, wherein the ratio of the number of the turns of said winding to said primary winding approaches 1.

14. The power factor correction circuit of claim 9, wherein said switching
10 device controls said capacitor to charge said primary winding.

15. The power factor correction circuit of claim 9, wherein said capacitor is charged when said diode is forward-biased.

15 16. The power factor correction circuit of claim 9, wherein a power is transferred to said secondary winding through said primary winding when said diode is reverse-biased.

17. A power factor correction circuit for improving a power factor of a
20 switching power supply, wherein said switching power supply is composed of said power factor correction circuit and a converter with a secondary winding and a primary winding coupling with a switching device, said circuit comprising:
a winding with an opposite polarity to said primary winding, wherein said winding, said secondary winding and said primary winding are wound in a same
25 core.;

a diode coupled with said winding;
an inductor coupled with said diode; and
a capacitor coupled with said inductor, wherein said capacitor and said inductor have a common node connected with said primary winding.

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18. The power factor correction circuit of claim 17, wherein said inductor is used to filter noise.

19. The power factor correction circuit of claim 17, wherein said
10 converter is a forward-type, push-pull-type, half-bridge-type, full-bridge-type or resistor-capacitor-control type.

20. The power factor correction circuit of claim 17, wherein the ratio of
15 the number of the turns of said winding to said primary winding approaches 1.

21. The power factor correction circuit of claim 17, wherein said switching device controls said capacitor to charge said primary winding.

20 22. The power factor correction circuit of claim 17, wherein said capacitor is charged when said diode is forward-biased.

23. The power factor correction circuit of claim 17, wherein a power is
transferred to said secondary winding through said primary winding when said
25 diode is reverse-biased.